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ASYNCHRONOUS FORUMS IN EAP: ASSESSMENT ISSUES

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This paper reports on a pilot and a subsequent study that focused on the assessment of student writing in asynchronous text-stimulated forum discussions. The study, which was conducted in advanced English for Academic Purposes (EAP) courses, aimed at determining suitable assessment criteria for written academic discussions. In addition, the study tapped student attitudes toward forums, checked the effect of forum participation on student writing, and characterized the text-stimulated forum discussions.

Based on a content analysis of the pilot data, the constructs of reflection and interaction were selected as assessment criteria to be evaluated in the main study. These criteria were found to be usable but insufficient for student assessment in the EAP courses. A questionnaire showed that the student attitudes were positive and that most students felt that their writing improved, even though an analysis of language complexity showed no significant improvement. A qualitative analysis of the transcripts revealed deep student involvement with the content and with their peers as well as an academic register interspersed with conversational interactions.

INTRODUCTION

Asynchronous online forums provide a venue for thoughtful discussion and as such have become a common component in both distance and blended courses (Cummings, Bonk, & Jacobs, 2002). These discussions allow for dynamic growth, development, and interchange of ideas among students, and therefore can play an important role in student learning (Barbour & Collins, 2005; Wu & Hiltz, 2004).

Online discussions are not uniformly implemented in courses. In some courses, discussion participation is mandatory (e.g., Wu & Hiltz, 2004); in others, it is not required (Sullivan & Pratt, 1996). In some courses, the forum discussions are closely related in time and topic to class sessions (e.g., Biesenbach-Lucas, 2004), while in others, the connection to the lectures is not direct and may be perceived negatively by students as a non-essential add-on to the course (Chong, 1998; Sherry, 2000). Some forum discussions are clearly structured by the instructor, who specifies the aspects of the topic or questions to be focused on (Black, 2005); other forums do not stipulate anything beyond the topic and allow students free range of exploration (Dougiamas & Taylor, 2003). In some forums, instructors are regular participants, responding to student questions and providing corrective feedback (Sotillo, 2000); in others, the instructor is an observer, whose presence is felt but not seen (Biesenbach-Lucas, 2004). In some cases, students get credit just for participating (Sotillo, 2000), while in others, forum participation is on a volunteer basis and no course credit is given (Althaus, 1996). In some online discussions, the groups are kept fairly small: 3–7 students (Bohlke, 2003; Warschauer, 1996), while in others, the whole class participates (Sullivan & Pratt, 1996).

In a discussion forum, students can brainstorm, disseminate information, role-play, and discuss course material, and the asynchronous nature of the discussion allows time for reflection (Althaus, 1996; Harasim, 1992; Warschauer, 1999). This reflection, labeled the "ripple effect" by Bernath and Rubin (1999), can lead to the deep thinking that is necessary to make connections between new and old information, integrate the two, and synthesize; that is, the reflection can give rise to a new perspective, which can engender the development of new ideas from existing information.

By promoting student engagement, reflection, and critical thinking (Duffy, Dueber, & Hawley, 1998; Garrison, Anderson, & Archer, 2000; Jonassen, 1994; Sherry, 2000), forums can be used to enhance the

learning experience (Bernath & Hulsmann, undated; Bhagyavati et al., 2005). When students struggle to organize their thoughts and put them in writing for an authentic audience, deeper cognitive processing may be at work, leading to more learning (Berge, 1997; Zamel, 1992). As Lapadat (2002) said, "Expressing oneself via a written medium holds the promise of writing one's way into understanding". Lemke (1989) concurs that writing facilitates the construction of meaning. However, in practice, this does not always happen (McLoughlin & Luca, 2000); for example, in a study by Angeli, Bonk, and Hara (1998), many of the online interactions were superficial, and the claims made by the students were unsupported. Nevertheless, learners seem to feel that online discussions are useful (Harasim, 1992; Wu & Hiltz, 2004).

If writing helps to clarify the learner's understanding, then reading-based writing may be especially useful when reading texts in a second language. "Writing allows insights that may have been inaccessible . . . at the time the text was read" (Zamel, 1992, p. 472). Moreover, Pellettieri (2000) claimed that as learners attempt to formulate and support their ideas in the most exact language possible and organize the presentation of the ideas in a logical fashion, they could experience vocabulary acquisition as well as syntactic growth.

In language courses, forums may serve the following purposes: encouraging thoughtful communication in the language, allowing for the development of writing skills, providing a framework for text discussion, and facilitating the acquisition of what Chun (1994) calls "interactive competence." Warschauer (1999) has described how computer-mediated communication facilitates the combination of the two language functions, interaction and reflection. Reflective interaction can promote language learning (Ellis, 2005; Lamy & Goodfellow, 1999; Ortega, 1997; Sauvignon, 2002; Warschauer, 2007) by motivating students "to stretch their linguistic resources in order to meet the demands of real communication in a social context" (Ortega, 1997, p. 83). Although some of this research refers to synchronous computer-mediated communication (CMC), interactive competence and social skills are relevant to both synchronous and asynchronous communication.

A relevant issue in the use of asynchronous forums in education is the assessment of student contributions in the context of the level and objectives of the course. The following section begins with a short survey of writing assessment in general and proceeds to a review of the literature dealing with forum analysis and assessment.

Assessing Forum Contributions

In academic contexts, the quality of first-language papers is usually assessed by evaluating the accuracy of the content, the originality and development of thoughts and ideas, and the soundness of the writer's logic (Weigle, 2002). When dealing with English as a second or foreign language, language elements (e.g., morphological, lexical, or syntactic accuracy) play an important role. Language elements are not only used to measure quality at a point in time, but also can be used as signs of language development over time.

Language instructors may tend to favor fluency (often defined as writing easily and as much as possible in the time given) over language accuracy (defined as degree of correctness or avoidance of mistakes), but many feel that both deserve attention. Accuracy is especially important for writing in academic contexts (Weigle, 2002) and is assessed by analyzing the number and types of errors. Fluency in writing can be measured in many different ways, depending on how fluency is defined (Wolfe-Quintero, Inagaki, & Kim, 1998). In our study, given that the discussions were asynchronous, fluency was measured by the amount of writing that was produced (text length), rather than the amount of writing produced in a given amount of time. However, neither fluency nor accuracy was part of the student assessment.

Another construct often used to measure second language development is language complexity, which may focus on lexical factors or syntactic factors. Lexical complexity is reflected in two dimensions: range

(lexical variation) and size (lexical sophistication) of a second language writer's productive vocabulary (Wolfe-Quintero, Inagaki, & Kim, 1998). An analysis of lexical complexity looks at how many different words are used or how sophisticated the words are.

Syntactic complexity reflects elements such as sentence length, amount of embedding, and range and sophistication of structures (Ortega, 2003). However, the relation between syntactic complexity measures and improved writing quality or linguistic ability is not clear (Grabe & Kaplan, 1996; Ortega, 2003). Moreover, the relationship between sentence-level complexity and overall quality as reflected in coherence, for example, is not well established either (Grabe & Kaplan, 1996). Despite these reservations, as part of the exploration, language complexity was measured so as to obtain a more detailed picture of student contributions.

Computer Mediated Communication (CMC) is somewhere on the continuum between paper-based writing and speech (Kern, 2006). As a distinct form of writing, it therefore requires a customized form of assessment. When assessing forum contributions, in addition to the criteria normally used to evaluate compositions or essays, communicative parameters, such as the ability to participate in a written discussion, need to be taken into account. The realization of the difference between forum writing and the writing of traditional papers was a motivation to search for parameters that characterize quality in forum writing. These parameters could then serve as assessment criteria to grade student contributions.

How can forum discussions be analyzed? Some studies focus on the nature of student messages or their length, depth, or purpose. Henri (1992) proposed a model for analyzing CMC messages tapping five aspects of the learning process as reflected in the messages: participative, interactive, social, cognitive, and metacognitive. This model focused on process rather than product and has been used by many other researchers of CMC (e.g., Angeli, Bonk, & Hara, 1998; Hara, Bonk, & Angeli, 2002; Schrire, 2003) as a basis for their work or the development of their own models. Oskoz (2005) and McLoughlin and Luca (2000) have also developed process-based systems for the analysis of online interactions. The latter traces knowledge construction as it moves through five phases from knowledge sharing to knowledge building.

However, many systems for analyzing CMC messages are too tedious and time-consuming to serve as practical assessment tools (Dringus & Ellis, 2004; Ho, 2002). Practitioners need to assess student contributions fairly and efficiently and may not be able to go into all the details encompassed in the descriptive instruments used for research. In addition, instructors need to focus on the achievement of course objectives. To aid instructors in assessing forum contributions, Dringus and Ellis (2004) developed SCAFFOLD—Scale for Forums/Online Discussion Assessment, which used the following criteria: interaction, analysis, expansion of discussion scope, clarification, closure, comprehensiveness, accuracy of information, degree of evaluation, originality, reflection, synthesis, and summary. Bauer (2002) added the criteria of stimulating discussion and critiquing other students' contributions.

The aforementioned criteria were developed for content courses. Criteria need to be determined for assessing student forum writing in language courses. This paper reports on a study of the use of forums for text-stimulated discussions in advanced English for Academic Purposes (EAP) courses. The main aims of the study were to determine what constitutes quality in online discussions in EAP courses and then to find suitable criteria for assessing student forum contributions. In addition, the study attempted to tap student attitudes toward forums and check the effect of forum participation on student writing. Moreover, the extensive data available was used to characterize the text-stimulated forum discussions. It was hoped that through this kind of multi-focused investigation of forums, broader insights would emerge that could prove useful to professionals in the field.

FORUMS IN EAP: PILOT AND MAIN STUDY

The goals for using forums in the EAP courses were to provide a framework for text discussion where every student in the class could participate, to encourage thoughtful communication in English, and to offer an authentic and relevant writing experience.

The research was carried out at Tel Aviv University over two semesters. In the first semester, a pilot was conducted to determine criteria for assessing student forum contributions. The following semester, the main study evaluated whether the assessment criteria selected in the pilot study were usable and sufficient. An additional aim of the study was to learn more about text-stimulated forum discussions in EAP courses.

The participants were freshmen taking one-semester advanced-level EAP courses, specific to different subject areas. The courses in the first semester (pilot) and the second semester (main study) were different, and so were the students. The students were mainly native speakers of Hebrew, with substantial numbers of native speakers of Arabic and Russian. The average student age was 23, and both genders were equally represented. In both semesters, the participants were required to participate in four text-stimulated forum discussions and answer an attitude questionnaire at the end of the course. The courses were taught by the researchers. The software used for the threaded forum discussions is part of the learning management system used by the university (Britannica HighLearn).

The Pilot

The purpose of the pilot was to determine criteria for assessing student forum contributions. The participants were 94 undergraduate students in four advanced-level EAP courses. The courses, which met for 4 hours a week, were English for Mathematics and Computer Science, English for Physiotherapy, English for Occupational Therapy, and English for Chemistry. The first three forums were whole class discussions, and the last forum was used for small-group (3- to 5-student) discussions of texts in preparation for a class symposium. Each group selected a different topic for presentation to the class in the symposium, and the forum gave the groups an opportunity to collaborate outside of class. All forums had the same guidelines (see Figure 1), which was necessary because the students were assessed on how well they followed the generic guidelines. Each forum was kept open for approximately two weeks.

1. **a. Ask** at least **one question** on the article about something that is not clear to you.
   b. Answer at least **one question** that someone asked.
2. **a. Express your thoughts** on the articles you read.
   b. React to at least one other person's thoughts.

Figure 1. Forum guidelines in pilot.

Although the instructors observed the forum activity, they did not participate. It was hoped that the forums would provide a framework for free and fluent writing, unconstrained by teacher presence and not subject to the observer effect (Bogdan & Biklen, 1982). In an attempt to assess student contributions according to more than mere participation, the assessment was based on how well the students followed the guidelines. That is, the students received credit for following the forum instructions, including asking and answering questions about the article and listing interesting points. Language accuracy was not assessed because the focus of the advanced EAP courses is text comprehension and language is not explicitly taught. The forum grades constituted 15% of the final mark for the course.

According to Warschauer (1999), reflection and interaction intersect in forum communication. Given that the main goal in the forums was thoughtful communication, the data analysis was focused on the presence of reflection as well as interaction. These two constructs seemed particularly relevant to text-stimulated forum discussions because the text discussions involved the expression of ideas—presupposing

reflection—and the exchange of ideas with others. The constructs seemed possible candidates for assessment criteria. Language accuracy, on the other hand, did not seem at the time a suitable criterion, given that the goal of the forums was not writing improvement.

Data Analysis

To use reflection and interaction in the assessment process, a list of identifiable signs of the two had to be developed. Therefore, the data were searched for instances of the two constructs, a taxonomy of the signs of reflection and interaction was developed, and a list of language markers was compiled (Tables 1 and 2). *Signs* are the actions or deeds that show that an underlying event has occurred; for example, agreeing and disagreeing show that thought or reflection has occurred. *Language markers* are the words that signal the realization of the action; for example, the words *I concur* show that the writer has thought about a point and agrees with an idea that was expressed.

Table 1. Signs and Markers of Reflection

Signs of reflection	**Markers of reflection**	**Data examples**
Critically analyzes content and form	I think/believe/feel/see . . . I started wondering about . . .	"In my opinion the article deals too much with the ridiculous claim that organs have the same status as a live human being."
Agrees/disagrees with author's views	I agree/disagree/object . . .	"I don't agree with the author because cloning is against religious law."
Recapitulates and summarizes	I now realize/understand/see that . . .	"Now I realize just how important cloning is."
Expresses insights/ideas	After reading the article I think that . . .	"I think humanity needs rules."
Connects text to other sources	I read an article about that . . . That reminds me of . . .	"Here's a link to something else about gene therapy."
Expresses reactions, opinions, conclusions, implications	I was surprised/angry/upset/in awe . . . It made me think about the issue seriously.	"Is there any way to create a male baby without any help from men?"
Supports views through facts, analogies, and examples	Let me give an example. . . This is like. . .	"I think all the mess began after the cloning of Dolly because before this people didn't believe it would ever happen."

At the end of the semester, the students completed a short questionnaire that tapped their attitudes toward the forums and their perceptions of the usefulness of the forums for text discussion and improving their English. Most questions required a yes-no response, and one required the students to check adjectives that they felt applied to the use of the forums for text discussion. The results of the attitude questionnaire are given in Table 3.

As can be seen in Table 3, most students felt that the forum discussions were effective in both improving their English (63%) and understanding the texts (73%). The latter finding may reflect the forum instructions, which explicitly required students to ask about unclear points in the text and to answer classmates' questions. Regarding the importance of the grade, the students were divided almost equally. However, only one third of the students chose the adjectives *pleasant* and *motivating* to describe how they felt about the use of the forums, and most students did not feel that participating in the forums was easy. Informal conversations with the students revealed that some felt that participation in the forums required

time and effort that they did not have, due to the already demanding curriculum and course requirements. In addition, those students living in dormitories complained about trouble finding available computers in the dorms at night. These factors may explain the low percentages. They may also explain why only 32% of the students chose the adjectives *pleasant* and *motivating.*

Table 2. Signs and Markers of Interaction

Signs of interaction	**Markers of interaction**
Asks and answers "real" questions related to the text	In the text he talks about . . . /Is this related to . . . /Do you know of any other . . . /I think the answer you are looking for is in par. X
Clarifies views/requests clarification	I think you misunderstood my idea/What do you mean?
Agrees/disagrees with peer/suggests modification	As X said/There is a problem/I would like to sharpen X's thoughts/I almost agree with you/I think you forgot something very important
Tries to persuade	Don't you think that . . . /I think you should . . .
Evaluates peer contributions	Your question is very relevant/I think you wrote very important points
Encourages interaction	Please send me your opinions and feelings/Share your views with me

Table 3. Student Attitudes: Pilot

Question	**Yes Response (%)**
Did participation in the forum help you improve your English?	63
Did writing your ideas and getting feedback from your friends help you understand the texts?	73
Should the grade for the forums be included in the course grade?	51
Was it easy to participate in the forums?	35
Were the forum discussions pleasant and motivating?	32

The analysis of the pilot data guided the framing of the research questions for the main study. The taxonomy of signs of reflection and interaction developed in the pilot provided the basis for the checklist used as a tool for assessing student forum contributions the following semester.

Main Study

The research questions that guided the main study were

1. Are reflection and interaction usable and sufficient criteria to assess student contributions?
2. How do students feel about the use of forums?
3. Does forum participation over one semester affect student writing in terms of language complexity?

Method

In preparation for the study, four online tutorials were created to explain the nature of reflection and interaction and teach the language markers required for those functions. The tutorials explain how to agree and disagree, express an opinion, support an opinion, and interact with others. At the beginning of the semester, the markers of reflection and interaction were taught, and the tutorials were put online.

The participants were 156 students in four advanced-level courses. The courses, which met for 4 hours a week for a semester, were English for Mathematics and Computer Science, English for Engineering, and

two sections of English for Biology. The courses followed a mixed-mode, blended learning approach, in which most of the lessons were conducted in the classroom and occasionally in the computer learning center. Each of the classes had a course site, and a number of the homework assignments required use of the site for Internet-based tasks. Instruction and practice in digital literacy skills, such as skimming a digital article or using an online dictionary, were part of the course curriculum. Forums were an integral, graded part of the courses and took the place of text-based homework questions. A grade, along with teacher feedback on the contributions, was e-mailed to each student after each forum was closed.

The students wrote to a practice forum before receiving any instruction on forum writing. These messages constituted the baseline for comparison. In addition to the practice forum, students participated in three forums. All forums were whole class discussions, and guidelines were slightly adapted for each forum according to the needs of the specific course and readings. In general, students were asked to express their ideas on a topic related to texts that they had read and respond to others' statements and questions (see Figure 2 for an example of forum instructions). The instructions used the word "discuss" without specifying exactly how the discussion should be conducted. This change from the pilot instructions was made to allow for a more spontaneous and natural exchange of ideas. Students were instructed to write their forum messages as academic exchanges and to avoid informal abbreviations (e.g., ur for "you are") and other informal usage. The length of forum messages was not specified because the focus was on the quality of the forum communication, rather than on the quantity. Each forum was open for about two weeks.

1. Read the article on the new translation device.
2. Discuss what you have read:
 a. Comment on the features of the device, ask questions about points you didn't understand, or express your thoughts on additional applications of the device.
 b. Read your classmates' contributions and react to them.

Figure 2. Example of forum instructions in main study

Students were informed that their contributions would be checked for evidence of reflection on both general and specific points in the text and for interaction with other students. As in the pilot, the instructors did not participate in the online discussions. Forum participation constituted 15% of the final mark.

To assess the student forum contributions, the messages were checked for evidence of reflection and interaction. Equal weight was given to each of the two criteria. At first, an attempt was made to break down the grade into quality and quantity, but determining the quality of reflection was not only difficult but also possibly invalid in the context of an EAP course. The aim of the assessment of reflection was not to judge the breadth or depth of thought, but rather to determine whether the students comprehended the text, expressed their views, and supported them.

Data Analysis

To determine if reflection and interaction were usable criteria, a checklist based on the signs and markers (see Tables 1 and 2) was prepared and used for assessment. In practice, the signs, more so than the markers, guided the assessment. In addition, the time spent assessing student contributions was recorded. To determine if reflection and interaction were sufficient criteria, the quality of 20 forum contributions was holistically assessed by the authors using a six-point scale (inter-rater reliability = 0.72) and compared with the grades given on the basis of reflection and interaction. In cases of discrepancy between the two, the data were analyzed to clarify the cause.

To tap student attitudes towards the forums, an online survey was administered at the end of the semester. The survey checked how students felt about forum usefulness in advanced language courses and the contribution of forums to students' reading, writing, and communicative skills.

To check whether the forum participation had affected the student writing, a text analysis was performed comparing the first and last forums, using a random sample of 20 students. To perform the analysis, all contributions to a forum by each of the 20 students were put together and analyzed using the Textalyser program (http://textalyser.net/). The program taps four measures: number of words (reflecting quantity or fluency), lexical diversity (reflecting richness of vocabulary), word length (reflecting lexical sophistication), and average number of words per sentence (reflecting syntactic complexity).

Even though the characterization of the forum communication was not one of the main goals of the study, the available transcripts were used for this purpose. Table 4 lists the forums included in the analysis for forum characterization and specifies their coding.

The goal of the qualitative analysis of the forum transcripts was to develop a better understanding of the features of communication in our text-stimulated forum discussions, for which students were given specific guidelines and assessment criteria. Regularities or patterns, or what Tesch (1990, p. 113) calls "commonalities," were searched for in the data, through repetitive readings of the transcripts. The analysis involved extracting what seemed to be significant or key phrases/sentences and then clustering them by category or issue. In addition, the awareness of audience and the overall flow of the discussions were checked.

The goal of the quantitative analysis was to check the amount of student writing (length of contributions), the presence or absence of audience awareness (explicit acknowledgment of others but not necessarily implying interaction), and the extent of interaction (number of replies to a thread-opening message).

Table 4. Forum Coding

Forum	**Class**	**Forum topic**
1	Biology, Section 1	Extinctions
2	Biology, Section 1	Cloning
3	Biology, Section 2	Extinctions
4	Biology, Section 2	Cloning
5	Math & Computer Science	Fermat
6	Math & Computer Science	Cloning
7	Engineering	Fermat
8	Engineering	Cloning

RESULTS AND DISCUSSION

Usability and Sufficiency of Assessment Criteria

The instances of reflection and interaction were easily located, so the assessment criteria were deemed usable.

Assessing a student's contributions to a forum took an average of 25 minutes, meaning that it could take two full days to mark one forum for a class of 30 students. The assessment involved reading each contribution in the context of the other students' messages and checking for the presence of reflection and interaction, whether explicitly marked or not. However, because reading a student's contributions often required "jumping" from page to page to find all of that student's messages as well as remembering what the student had written on the previous page, the time involved may not be a function of the criteria but rather a result of the technical aspects of the application. In other words, grading using other criteria would probably have taken just as long.

Although interaction and reflection were found to be usable assessment criteria, they did not prove to be sufficient. The comparison of the holistic assessment with the criteria-based grades showed that the two did not always match. In the cases of discrepancy, the holistic assessment was always lower. A closer look at those contributions revealed that in some cases, although the students had received full credit for reflection and interaction, their English was poor. In other cases, the contributions did not refer specifically to information in the texts, meaning that the students may have written without having read the texts carefully. As a result of this comparison, the criteria of reflection and interaction were deemed insufficient for assessing text-stimulated forum discussions in the EAP courses.

Student Attitudes Towards the EAP Forums

The results of the student attitude questionnaire are presented in Table 5.

Table 5. Student Attitudes

Question	Yes
Were the tutorials helpful?	76%
Should English courses include forums?	73%
Did the grade motivate you to write better?	70%
Did the forums help you improve your writing?	70%
Should the teacher participate in the forums?	53%
Did the forums help you learn new words?	44%
Did the forums help you understand the texts?	40%
Did the forum help you prepare for the quiz?	24%

As shown in Table 5, even though writing in the forums was time consuming, a large percentage of the students felt that forums should be included in the English courses, that is, that the activity was worthwhile. Similarly, a large percentage of the students felt that their writing improved as a result of their forum writing experiences. However, less than half of the students said that the forums helped them understand the texts. This is probably a result of the fact that, in the forums, students discussed their reactions to the ideas that interested them rather than discuss what was unclear in the texts. As mentioned above, in the main study, the forum instructions did not explicitly require students to ask and answer questions about the text.

The high percentage of positive answers to the question of whether forums should be included in the EAP courses may reflect the fact that the students appreciated the extra opportunity to communicate with their peers, as reflected in comments 3 and 5 below. Comment 1 probably represents the feelings of the 27% who felt that forums should not be part of the course. Comments 2 and 4 show a preference for this type of task over more traditional homework tasks.

1) "Forum participation should not be required but optional. I usually just write something because I have to, and it weighs down on me."
2) "Forum participation enriched the course. It forced me to use English to express thoughts and feelings . . . it improved my vocabulary and writing skills."
3) "It allowed me to get to know my classmates better."
4) "Forum text discussions are much better than answering questions on worksheets!"
5) "It was interesting to read my classmates' comments."

The fact that 70% of the students felt that the grade was important to motivate them seems to indicate that forum participation should be assessed and graded.

Effect of Asynchronous Discussion on Writing

The first and last forums were analyzed for language complexity. The text analysis comparing the two forums showed no significant differences in quantity, lexical diversity, word length, and number of words per sentence. In Table 6, *number of words* reflects quantity, which is also a sign of fluency; *lexical diversity* is the ratio of different words to the total number of words, reflecting lexical variation or richness of vocabulary, which is an indicator of textual quality; average number of *syllables per word* reflects word length, which indicates lexical sophistication; and average number of *words per sentence* is a measure of syntactic complexity (Ortega, 2003).

Table 6. Language Complexity Means (N=20)

	First Forum	**Last Forum**	***p***
Number of words	208	238	0.26
Lexical diversity	63%	60%	0.15
Mean Syllables per word	1.65	1.59	0.06
Mean Words per sentence	19.4	18.4	0.30

The fact that no significant differences were found between the language complexity in the first and last forums is not surprising for a number of reasons. First, in a short period of a few months, language development may not be observable with advanced students. An observation period of a year of college level instruction is probably needed for substantial changes in the syntactic complexity of L2 writing to be observed (Ortega, 2003). Second, although no significant improvement in language complexity was found, language improvement may have been evident had the criterion been other than language complexity, for example, grammatical accuracy. Thirdly, had the sample not been random but rather handpicked to include only the weaker students, improvement may have been apparent. Finally, the students probably had more time to devote to English assignments at the beginning of the semester, when they wrote for the first forum, than at the end of the semester, when they needed time to prepare for final exams in all their courses.

Forum Characteristics

A number of issues emerged from the qualitative and quantitative analyses of the forum transcripts. The results are discussed below and illustrative examples presented, unedited except for spelling corrections. The generalizability of these results is limited to forum discussions with similar contexts.

Qualitative

The qualitative analysis revealed the following characteristics**:**

Academic register plus. Students were instructed to write their forum messages as academic exchanges and to avoid informal abbreviations and other informal usage. At the same time, they knew that one of the assessment criteria was interaction with their peers. The analysis of the transcripts showed the use of written academic register accompanied by informal conversational interactions, including expression of feelings through smileys and exclamation points. Linguistically, the forum writing was an amalgam, containing both informal conversational elements and formal academic discourse. The informal elements, common in spoken registers (Biber, 2006), included language indicating thought processes and the expression of stance, for example, *I think*, and the language used to express feelings, for example, *I really don't have an answer, I wish I had. . . .* The students used compound and complex sentences as well as simple sentences. They used rich academic vocabulary, including adjectives, adverbs, and sentence connectors, which are not common in oral discussions (Crystal, 2001). Whether the words came from the dictionary or from other resources used, the data show that the students were aware of these lexical items as they consciously incorporated them into their forum messages. Here are some examples:

> "We don't hunt and destroy natural habitats of animals simply for survival, we do it mostly for our comfort, without taking into account the consequence of our actions." (Forum 3)
>
> "The inevitable question regarding the above facts is: How would human cloning affect the world population? Is it going to be a negligible factor? Is it going to extremely accelerate the overpopulation process?" (Forum 6)

Involvement with source materials and peer messages. Reflection and interaction were apparent in the forum messages through the opinions and thoughts students expressed, evidencing deep involvement with source materials and with peer opinions, reflected in expressions of disagreement, thoughtful questions posed to peers, and rhetorical questions.

The involvement with the source materials was evident in the claims students made and the support they provided. This type of writing can be assumed to be the product of a process of mindful reading of the resources. Here is an example:

> "Most people think that cloning is the victory of human over the nature. I want to refer to this issue by checking two points that in my opinion refute the sentence above. First of all scientists are using woman's egg, and need woman's womb for hosting…. Second, we can't promise that the clone will have the exact attributes like the source. He will be growing up in another environment and under different condition." (Forum 8)

Involvement with peer opinions is reflected in the following example:

> "Let me tell you something. You think that Wiles sacrificed his life because he abandoned his friends and because he lived in total isolation. Well, maybe for normal people this is a life of sacrifice, but for him this wasn't. For him, proving Fermat's last theorem was his goal and quitting from his lifetime goal will be the real sacrifice." (Forum 7)

At times, student involvement led to a sharing of their thought processes with the class (see the interactions in Appendix A, for example) and demonstrated how writing facilitates understanding (Lapadat, 2002).

Student interactions in the forums were explicit and constructive, often including a positive statement before expressing criticism, for example, "I agree with you about how it is amazing to think about theorems when you are ten years old !!! But in the other hand, . . ." (Forum 7). The interaction often went back and forth a number of times as the students responded to the remarks of their classmates (see Appendix B for an example). Moreover, all forum discussions stayed on topic.

The forum messages included many questions, as would be expected in authentic communicative exchanges, questions to which the writers genuinely seemed to be waiting for a reply. For example, in response to a student's comment that she would permit the cloning of animals but not of humans, another asked: "Why do you believe that scientists should be allowed to clone animals and not humans? What is the difference?" (Forum 2). Students also used rhetorical questions as a means of expressing their ideas, for example, "What will happen to our lives if clones will be allowed? People will create their babies . . ." (Forum 2).

Audience awareness was evident in almost all of the messages. Crystal (2001, p. 18) claimed, ". . . as the Internet is a medium almost entirely dependent on reactions to written messages, awareness of audience must hold a primary place in any discussion." Forum 7 (with 67 messages) was randomly selected, and the initial sentences in each message were read. In almost all of the initial sentences, the students indicated awareness of their audience at some point, for example, "Hi **everyone**" or a reference to "an article that **WE** read."

Forum messages also included references to peer contributions and required source materials, with occasional extension beyond the required readings and the classroom. Some messages showed that students chose to read several postings before contributing to the discussion. For example, "As many of you claimed, and I agree, biological diversity is tremendously important to humankind" (Forum 3). Moreover, students appreciated the new perspective gained from reading their classmates' messages, for example, "You gave me a new point of view" (Forum 4). Whether the purpose of reading the messages was to decide to whom to respond, to see what their classmates thought, or simply to look over sample contributions, students were involved in this authentic reading experience as a side effect of the forum writing assignment.

Not only did students discuss the forum topics with their classmates through the forums, but some also talked with their friends and families: "I came home and asked my family and friends what their opinion was, and as I expected they were all amazed" (Forum 8). Others connected the forum discussions to external knowledge resources: "In my opinion (and as we learned in ecology class) . . ." (Forum 1).

Quantitative

Through the quantitative analysis of the data and the records, the following characteristics emerged:

Characteristic length of contributions. A quantitative feature that can be used to characterize online messages is length. In a group discussion of a novel in a U.S. college, Crystal (2001) found an average message length of 8.1 lines (p. 145). In the analysis, great variance was found in the lengths of the contributions, ranging from extremes of only a few words to several hundred words. To estimate the amount of English students wrote, the words in each of the messages in Forum 1 were counted, and the other forums were searched for very short and very long messages. Forum 1 had an average of about 175 words per student, per forum, but this average gives only a rough idea of the amount of student writing, as the values were widely distributed and included extremes of 431 and 63. The longest single message in all the forums contained 887 words (many more than necessary), and the shortest, a mere 22 words (many fewer than expected).

Table 7. Unanswered Thread-Opening Messages

Forum	Unanswered thread-opening messages
5	24%
7	29%
1	37%
2	40%
3	42%
6	42%
8	52%
4	53%

Extent of interaction. The extent of interaction varied across the forums. Two related aspects of the interaction were checked: the number of thread-opening messages that went unanswered and the average number of replies to a thread-opening message. A thread-opening message is an attempt to start a threaded discussion. If no one replies, the thread never materializes. The percentages of thread-opening messages that went unanswered in each of the eight forums are presented in Table 7, in ascending order. All the forums contained thread-opening messages that went unanswered. The range was from 24 to 53%. What may explain this variation? Four explanations seem plausible: time, topic, language, and social reasons. For example, if a message was posted close to the date when the forum was 'locked,' other students would not have had time to answer (i.e., time). This was observed in many instances of unanswered messages. If the topic of a given message was not interesting or motivating, other students

would not have replied (i.e., topic). An unclear message, instead of being followed by a question of clarification may have been left unanswered by busy peers (i.e., language). It was observed that students tended to reply to their friends, and therefore some messages remained unanswered (i.e., social).

The interaction index (see Table 8), developed by the authors to measure the amount of interaction that took place, had a small range of values. This index was calculated by averaging the number of replies to each thread-opening message. The modified index is the average number of replies to those thread-opening messages for which there were replies, that is, excluding those thread-opening messages that had no replies. The average number of replies (see modified index) ranged from 2 to 4. What may explain the variance? One possible explanation is the interest level of the topic itself, and another is the interest level of the thread-opening message.

Table 8. Interaction Index

Forum	Interaction index	Modified index
6	2.53	4.36
1	2.47	3.92
7	2.24	3.13
3	1.57	2.75
8	1.21	2.50
5	1.67	2.12
2	1.24	2.07
4	0.94	2.00

The purpose of the analysis of the forum transcripts was to see how the students communicated in their asynchronous discussions. Did the forum guidelines and the assessment criteria affect student messages? They probably did because the guidelines and the criteria played a part in forming the context for the forum communication. In addition, assessment often has a backwash effect on what students pay attention to and how they perform. The analysis revealed that the students did indeed follow the guidelines, as was reflected in the characteristics of their writing. Interestingly, however, the analysis revealed an additional characteristic that was not part of the guidelines, namely, informal conversational style.

FINAL THOUGHTS

The insights that emerged from this study have deepened our understanding of the use of forums in EAP courses. Forums allow for written communication in English among students who would normally communicate in their native language. When language learners contribute to a forum discussion, they get experience in L2 communication, without slipping into their native language, as can occur in EFL class discussions.

In this study, the forum discussions required students to write about academic topics and express and support their ideas, while communicating with their peers in English. The asynchronous nature of the discussions allowed the students to think before "speaking," and the permanence of the writing may have encouraged them to be responsible for what they wrote. Asynchronous CMC seemed to encourage a unique type of thoughtful interchange.

Although the researchers originally thought that forum writing could substitute for text-based homework questions, the results of the study showed that the online discussions could not serve this purpose. Students were interested in discussing the ideas, especially the controversial ideas in a text, and not in checking to see if they were able to follow an argument correctly or understand a fine point. The students did not discuss the texts, as had been expected; rather, they used the forums to react to the ideas, the new information, and the authors' arguments. The texts constituted the stimuli and provided the content,

vocabulary, issues, and ideas for discussion. This may explain the results of the attitude questionnaire, which showed that very few students felt that the forum discussion helped them prepare for the quizzes or understand the texts. It may also explain the fact that students did not ask for text clarification in the forums.

Regarding the assessment criteria, reflection and interaction were found to be usable but insufficient. Based on this finding, two assessment criteria were added: a) language and b) reference to specific information in the text (see Figure 3 for the revised criteria). The former was added to encourage accuracy and clarity of expression and eventually to improve the quality of students' academic writing even if this was not the main goal of the forum discussions. The latter was added to encourage "text-responsible" (Weigle, Boldt, & Valsecchi, 2003) contributions. As in a typical academic discussion, students need to point to (i.e., cite) the specific information in the text that provided the basis for their thoughts. Further research could test the suitability and usability of the new set of criteria.

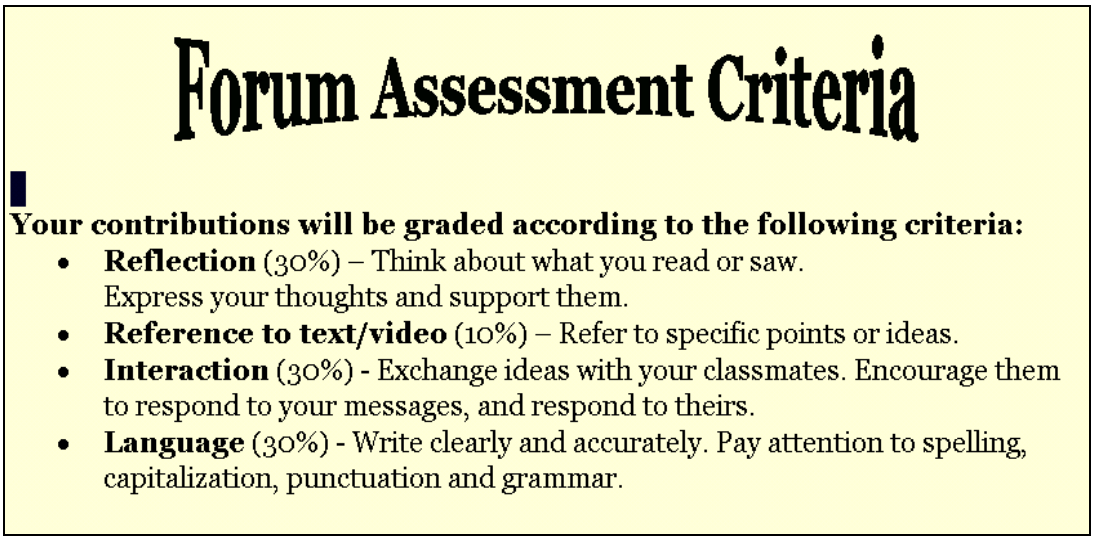

Figure 3. Revised assessment criteria now in use as guidelines for EAP forum writing.

The fact that a large majority of the students felt that forums should be part of the courses and should be graded lends relevance to the quest for assessment criteria. Moreover, the apparent effect of the guidelines on forum communication shows the importance of sound assessment criteria. The addition of a language criterion may raise language awareness and impact the quality of student writing. A future study could investigate the effect of the addition of the language criterion on grammatical accuracy.

Forum writing can now be assessed in a way that is suitable to context, medium, and purpose. The criteria of reflection and reference to information in the text make the assessment suitable to the academic context; the criterion of interaction makes the assessment suitable to the digital medium; and the criterion of language makes the assessment suitable to the purpose of language courses. The assessment criteria that emerged from this study may be used as a basis for guidelines for effective academic communication.

The forums offered students the opportunity to write extensively and mindfully, to use the rich academic vocabulary encountered in their readings, to learn from teacher feedback and peer contributions, and to become aware of the criteria necessary to assess and improve their writing. Based on the positive attitudes of the students and their reflection and interaction in the forums, there seems to be a place for text-stimulated forum discussions in EAP courses.

APPENDICES

Appendix A. Example of Extensive Forum Interaction

From the forum discussion on the proof of Fermat's Last Theorem in the course, "English for Engineering"

Message from S

I think that Andrew Wiles donated a big part of his life for math.

7 years he tried and succeed to prove Fermat Lest Theoren.

As I see it, Wiles sacrificed a bit of his personal life.

In the article, the author wrote that Wiles had abandoned any work, which was not directly relevant to Fermat Lest Theorem.

In order to keep his work confidential, Wiles needed to insolate himself from his familiar society.

My question for you is: dose it worth it? Dose the proof worth Wiles' sacrifice?

I would like to read what you think about it.

Sincerely yours

S

Reply from D

Hi S…,

I believe that all those years that Prof. Wiles devoted in order to prove Fermat's last theorem worth it. In retrospective it was worth even if he had failed to prove it.

I think so, mainly because his work developed the mathematics in a unique way. In page 19 it is said: "*I could try and prove results, which, even if they didn't get the whole thing, would be worthwhile mathematics. I didn't feel I'd be wasting my time*".

In order to show how he already contributed to the mathematics before he had completed his proof, I bring the following quotation from page 26: "*After three years of non-stop effort Wiles had made series of breakthroughs. He had applied Galois groups to elliptic*

Equations, he had broken the elliptic equations into an infinite number of pieces, and then he had proved that the first piece of every elliptic equation had to be modular".

In addition, he was awarded by the prize and glory that come with a successful proof of a 300 years problem, that great mathematicians had failed to prove.

Yours,

D

Reply from S

HEY S…

i read what you wrote, and i think that if someone has a dream, he should do everything to achieve it, even if he has to give up a lot. in WEILES'S case , he gave up his enviroment, but not his family that has ben their for him , so actually he succsseded achievung his dream, and yet having a supportive family, which in some cases is the best enviorment

that someone can have-so in some way-he had it whole.

sincerely yours, S

Reply from M

Regarding your question:

I think it is a tough question and there is no obvious answer.

Some would say that Wiles dedicared his life for proving a useless theorem. As we all know 'Fermat's Last Theorem' has no implementations. Furthermore it is almost insignificant as fr as the number theory is concerned.

Others would say that Mathmatics is a philosophical science that does not always have to connected top the real world. It means that when a mathematician faces a problem, he/she tries to solve it no matter what the consequences are. The purity of Mathmatics depends on its completeness and integrity. Therefore mathematicians are commited to solve all the open problems left in Mathmatics.

I belong to the second group.

Reply from A G

In the article we read about Wiles sacrificese. For 7 years he tried to prove a theory that cost him his life. It cost him his life because he abanded everything that was importent : his work ,his family and most important his friends. I think that when someone sacrifisied does things he sacrifice his life because that family and friends are some of the things that are the most important in life and nothing in the world do not worth this sacrifice, specially no math.....

Sincerely yours,

A G

The cost of the research Reply from S

In my opinion the cost he paid for the proving of the formula is not as high as you might think. It wasn’t said he was closed in his home for 7 years and tried to prove the formula, he had a social life and met with friends and even became a father. It might be the he had reduced the amount of the free time activities he participated in but still he wasn’t totally isolated from the society. Further more he tried to make his dream come true and he succeeded. Many people wasted their lives (literally) trying to make their dream come true so the 7 years he wasted for the research isn't very large amount of time and surely not time wasted for nothing.

Put yourselves in this situation! Reply from H

When I read the article I had some thinking about sacrificing your life for your study; and not only in math but also in any research.

Most of you said that the proof worth Wiles' sacrifices. Is it?!

I had some problems thinking this way.

Can you think about sacrificing your own life for your own research?

What about Wiles' choices; he abandoned he's friends, he worked along (with out even tell his colleagues), and even publish some research in order not to arouse suspicion.

Can you definitely sure you'll do the same?!

What about you're studying today? Do you truly sacrifice your own life in order to succeed this year?

If yes, do you feel ok with that, without any regrets? What about your friends, your family?

If you'll try to put yourselves in this situation, I think you will have much more problem answering simply "yes".

Sincerely yours,

H

Of course its worth it! Reply from Y

Let me tell you something.

You think that Wiles sacrificed his life, because he obendend his friends and because he lived in totall isoletion.

Well maybe for normal peopel this is a life scrifice, but for him this was'nt.

For him proving Fermat's last theorem was his goal, and quiting from his lifetime goal will be the real life sacrifice.

In my opinion the true way to solve a problam (like Fermat's last theorem) is Wiles way.

Furthermore I think that life are worth screficing for a limited time (7 years for example), for achieving your dream, think about it...

Sincerely yours,

Y

you made me think about.... Reply from K

As a student at a program that is specified for research, you made me think if that is what I want to do for living. On tha one hand, I'm very interested in the human body, and on the other hand, I want to live, to have life other than that.

As much as I want to learn about our body, and discover thing (without isolating...)' I also want to hav fun, have family and live a fully life...

Wiles chose to have one thing mainly. Without criticized him, I think that the favored way is to find the balance between them, and enjoy the both.

That's how i see it.

K (Medical student who joined the English for Engineering course)

childhood dreams... Reply from A

In my opinion, the answer to this question is not conclusive.

Andrew Wiles chose to fulfill his childhood dream, and realized that in order to do so, he would have to isolate himself for several years, until he would managed to work out the answer. There is no doubt that the height of mathematician's life is proving a theorem that no other mathematician in the last centuries has managed to prove.

Furthermore, one can see that he didn't neglect his family, out of the understanding that they were helping him by supporting him fulfill his dream.

Therefore I believe Andrew Wiles chose the way that was fit his dreams, instead of living normal boring mathematician life...

Sincerely yours,

S W

Appendix B. Example of Thought Development Shared in Forum

From forum discussion of cloning in the course English for Biology:

About the couple who lost their only son-what if it took them years of fertility tests and treatment in order to give birth to this one son which they adore, admire and worship the ground he walks on...I think I got carried away.

What I meant to say is: what if they *can't* have another child?

Also, even if they can have more children, who is to say this specific child might not have grown up to become a great scientist that will find a cure for cancer?

Then again, maybe he will become a bum or, if we consider the traumatic experience his parents have been through, a disturbed individual.

You can't tell, and nobody else can either... so that is why I think it's a problem to decide whether or not it should be legal to clone human beings.

I really don't have an answer, I wish I had ...

I was thinking about a governmental committee to decide whether a person should be cloned or not. However, such a committee may be prone to corruption, resulting in a situation where only the rich and powerful will be able to have a second chance for a better life, only they will be able to revive their loved ones and only they will be able to become in a way immortal.

Ergo I am not sure this is such a great idea.

Does anyone else have other suggestions?

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